UNITED STATES PATENT APPLICATION FOR:

IMPROVED METHOD FOR INSPECTION OF MAGNETIC DISC EDGE ROLL-OFF

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CERTIFICATION OF MAILING UNDER 37 C.F.R. 1.10

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IMPROVED METHOD FOR INSPECTION OF MAGNETIC DISC EDGE ROLL-OFF

[0001] This application claims benefit of United States Provisional Application No. 60/274,385, entitled Method for Inspection of Magnetic Disk Edge Roll-Off, filed March 9, 2001 by Shih-Fu L. Lee and David S. Kuo, which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention is directed to disc drives. More particularly, the present invention provides an efficient and accurate method for determining an outer diameter roll-off for each magnetic disc to be used in a disc drive. The present invention can be implemented during a process of magnetic disc manufacture to assure that discs having at least a preselected maximum radius for a data track band are made available for assembly into a disc drive.

BACKGROUND OF THE INVENTION

[0003] Disc drives are commonly used in workstations, personal computers, laptops and other computer systems to store large amounts of data that are readily available to a user. In general, a disc drive comprises a magnetic disc that is rotated by a spindle motor. The surface of the disc is divided into a series of data tracks. The data tracks are spaced radially from one another across a band having an inner diameter and an outer diameter. As should be understood, to maximize the amount of data that can be stored on a disc surface, the inner and outer diameters of the data track band should be as close as possible to the inner and outer diameters of the disc itself.

[0004] Each of the data tracks extends generally circumferentially around the disc and can store data in the form of magnetic transitions within the radial extent of the track on the disc surface. An interactive element, such as a magnetic transducer, is

used to sense the magnetic transitions to read data, or an electromagnetic element to generate magnetic flux that causes a magnetic transition on the disc surface, to write data. The magnetic transducer includes a read/write gap that contains the active elements of the transducer at a position suitable for interaction with the magnetic surface of the disc.

[0005] As known in the art, the magnetic transducer is mounted by a head structure to a rotary actuator and is selectively positioned by the actuator over a preselected data track of the disc to either read data from or write data to the preselected data track of the disc, as the disc rotates below the transducer. The head structure includes a slider having an air bearing surface that causes the transducer to fly above the data tracks of the disc surface due to fluid currents caused by rotation of the disc. The air bearing surface of the slider has a leading edge and a trailing edge. Typically, in currently used heads, such as, e.g., Transverse Pressure Contour (TPC) heads, two spaced rails are arranged to extend longitudinally along the lateral sides of the air bearing surface, one adjacent each lateral side, from the leading edge to the trailing edge of the surface. The rails provide various pressure effects to cause head flying operation.

[0006] Thus, the transducer does not physically contact the disc surface during normal operation of the disc drive. The amount of distance that the transducer flies above the disc surface is referred to as the "fly height". It is a design goal to maintain the fly height of the head at an even level regardless of the radial position of the head.

[0007] In modern disc drives, a relatively rigid or hard disc is used as the magnetic medium. The disc comprises a hard substrate such as aluminum. Layers of various materials are applied to the surface of the aluminum substrate by, e.g., a sputtering process to provide layers that are substantially smooth and flat. The surfaces obtained from the sputtering process are designed to facilitate an even fly height for the head. The layered materials include a layer of magnetic material to provide the recording medium for the magnetic transitions representing data.

[0008] Typically, the outer diameter of the substrate is sloped at the radial outer end of the disc shape. This is referred to as the roll-off of the disc. Thus, at the outer diameter of the disc, the disc surface is no longer flat and usable to sustain a stable fly